# CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A pixel sensor cell comprising:

a photoconversion device;

a gate located over said photoconversion device;

a contact connected to said gate;

a charge collection region for receiving charges from said photoconversion device; and

a transistor for transferring charge from said photoconversion device to said charge collection region.

2. The pixel sensor cell according to claim 1 wherein said pixel sensor cell is arranged such that said photoconversion device has a reduced pinning voltage ($V_{PIN}$) when a negative bias is applied to said contact.

3. The pixel sensor cell according to claim 2 wherein said gate reduces an energy barrier between said photoconversion device and said charge collection region.

4. The pixel sensor cell according to claim 1 wherein said gate comprises a dielectric substance layer and a polysilicon layer.

5. The pixel sensor cell according to claim 1 wherein said transistor includes a transfer transistor.

6. The pixel sensor cell according to claim 1 wherein said photoconversion device includes a photodiode.

7. The pixel sensor cell according to claim 1 wherein said charge collection region includes a floating diffusion region.

8. A pixel sensor cell comprising:

a substrate having a first surface level;

a photoconversion device having a first doped region of a first conductivity type and a second doped region of a second conductivity type located within said substrate;

a dielectric substance layer formed over the first surface level of said substrate thereby forming a second surface level;

a polysilicon layer formed over said second surface level;

a contact connected to said polysilicon layer; and

a transistor located adjacent to said photoconversion device.

9. The pixel sensor cell according to claim 8 wherein said dielectric substance layer has a thickness in the range of about 50-150 Å.

10. The pixel sensor cell according to claim 8 wherein said dielectric substance layer includes silicon dioxide.

11. The pixel sensor cell according to claim 8 wherein said dielectric substance layer includes silicon nitride ($Si_3N_4$).

12. The pixel sensor cell according to claim 8 wherein said dielectric substance layer includes silicon oxynitride (SiON).

13. The pixel sensor cell according to claim 8 wherein said polysilicon layer has a thickness in the range of about 500-1500 Å.

14. The pixel sensor cell according to claim 8 wherein said polysilicon layer includes silicon germanium.

15. The pixel sensor cell according to claim 14 wherein said polysilicon layer includes silicon germanium in a ratio of about $Si_{60}Ge_{40}$.

16. The pixel sensor cell according to claim 8 wherein said transistor includes a transfer transistor.

17. The pixel sensor cell according to claim 8 wherein said polysilicon layer overlaps at least a portion of said transistor.

18. The pixel sensor cell according to claim 8 wherein said pixel sensor cell is part of a CMOS imager.

19. The pixel sensor cell according to claim 8 wherein said pixel sensor cell is part of a charge coupled device (CCD) imager.

20. An imager comprising:

an array of pixel sensor cells, each pixel sensor cell having a photoconversion device;

a substrate having a first surface level, said photoconversion devices being located within said substrate;

photodiode gates located over said substrate first surface level and over said photoconversion devices, and contacts connected to said photodiode gates; and

signal processing circuitry formed in said substrate and electrically connected to the array for receiving and processing signals representing an image output by the array and for providing output data representing said image.

21. The imager according to claim 20 wherein said photodiode gate further comprises a dielectric substance layer and a polysilicon layer.

22. The imager according to claim 20 wherein said imager is a CMOS imager.

23. The imager according to claim 20 wherein said imager is a charge coupled device (CCD) imager.

24. A processing system comprising:

a processor; and

an imager coupled to said processor, said imager comprising:

a substrate having a first surface level;

a photoconversion device located within said substrate;

a photodiode gate located over said substrate first surface level and over said photoconversion device, and a contact connected to said photodiode gate; and

a readout circuit comprising at least an output transistor formed on said substrate.

25. The system according to claim 24 wherein said photodiode gate further comprises a dielectric substance layer and a polysilicon layer.

26. The system according to claim 24 wherein said imager is a CMOS imager.

27. The system according to claim 24 wherein said imager is a charge coupled device (CCD) imager.

28. A method of forming a sensor, comprising:

forming a substrate having a first surface level;

forming a photoconversion device with a pinning voltage ($V_{PIN}$), said photoconversion device having a first doped region of a first conductivity type and a second doped region of a second conductivity type beneath said first surface level of said substrate;

forming a photodiode gate including a dielectric substance layer over said first surface level of said substrate, thereby forming a second surface level;

forming a polysilicon layer over said second surface level;

connecting a contact to said photodiode gate; and

forming a charge collection region for receiving charges from said photoconversion device.

29. The method according to claim 28 further comprising applying a negative bias to said contact, such that said photodiode gate acts to reduce said pinning voltage ($V_{PIN}$) of said photoconversion device.

30. The method according to claim 29 wherein said photodiode gate is arranged to reduce an energy barrier between said photoconversion device and said charge collection region.

31. The method according to claim 28 wherein said dielectric substance layer has a thickness in the range of about 50-150 Å.

32. The method according to claim 28 wherein said dielectric substance includes silicon dioxide.

33. The method according to claim 28 wherein said dielectric substance includes silicon nitride ($Si_3N_4$).

34. The method according to claim 28 wherein said dielectric substance includes silicon oxynitride (SiON).

35. The method according to claim 28 wherein said polysilicon layer has a thickness in the range of about 500-1500 Å.

36. The method according to claim 28 wherein said polysilicon layer is formed of silicon germanium (SiGe).

37. The method according to claim 36 wherein said silicon germanium has a ratio of about $Si_{60}Ge_{40}$.

38. The method according to claim 28 wherein said charge collection region includes a floating diffusion region.

39. The method according to claim 28 further comprising a transfer transistor.

40. The method according to claim 39 wherein said second polysilicon layer overlaps at least a portion of said transistor.

41. The method according to claim 28 wherein said sensor is part of a CMOS imager.

42. The method according to claim 28 wherein said sensor is part of a charge coupled device (CCD) imager.